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Probing the chiral magnetic wave in pPb and PbPb collisions at sNN =5.02 TeV using charge-dependent azimuthal anisotropies (Article) (Open Access)

Sirunyan, A.M.^a, Tumasyan, A.^a, Adam, W.^b, Ambrogio, F.^b, Asilar, E.^b, Bergauer, T.^b, Brandstetter, J.^b, Brondolin, E.^b, Dragicevic, M.^b, Erö, J.^b, Flechl, M.^b, Friedl, M.^b, Frühwirth, R.^b, Ghete, V.M.^b, Grossmann, J.^b, Hrubec, J.^b, Jeitler, M.^b, König, A.^b, Krammer, N.^b, Krätschmer, I.^b, Liko, D.^b,

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Abstract

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Charge-dependent anisotropy Fourier coefficients (v_n) of particle azimuthal distributions are measured in pPb and PbPb collisions at sNN=5.02TeV with the CMS detector at the LHC. The normalized difference in the second-order anisotropy coefficients (v_2) between positively and negatively charged particles is found to depend linearly on the observed event charge asymmetry with comparable slopes for both pPb and PbPb collisions over a wide range of charged particle multiplicity. In PbPb, the third-order anisotropy coefficient v_3 shows a similar linear dependence with the same slope as seen for v_2 . The observed similarities between the v_2 slopes for pPb and PbPb, as well as the similar slopes for v_2 and v_3 in PbPb, are compatible with expectations based on local charge conservation in the decay of clusters or resonances, and constitute a challenge to the hypothesis that, at LHC energies, the observed charge asymmetry dependence of v_2 in heavy ion collisions arises from a chiral magnetic wave. ©2019 CERN, for the CMS Collaboration. Published by the American Physical Society under the terms of the Creative Commons Attribution 4.0 International license. Further distribution of this work must maintain attribution to the author(s) and the published article's title, journal citation, and DOI.

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